REMARKS

Receipt of the Office Action dated March 22, 2002 is acknowledged. Claims 11, 17-18, 22-24 and 30 have been amended herein. Claims 1-30 are pending. Claim 11 is objected to for obtaining a typographical error. Claims 1-12, 19 and 20 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Nagai et al. (U.S. Patent No. 4,390,520). Claims 1-4, 6-8, 11, 12, 19, 20 and 26-30 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Xia et al. (U.S. Patent No. 5,693,335). Claims 1-30 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Nagai et al. (Nagai), Xia et al. (Xia) or Miranda et al. (U.S. Patent No. 5,474,783). Reconsideration is requested.

I. Claim 11 is proper

Claim 11 was objected to as containing a typographical error. Claim 11 has been amended to delete this error. This amendment is solely clerical in nature and in no way affects the scope of the claim. Claim 30 was amended in a similar manner to correct the identical typographical error. Claims 17-18 and 22-24 were amended to correct minor typographical errors. Reconsideration is respectfully requested.

II. The Present Invention

The present invention relates to a dermal composition comprising a blend of a polymer composition of two or more polymers and a therapeutically effective amount of one or more drugs incorporated into the polymer composition. The term "blend" is defined in the specification to mean "that there is no, or substantially no, chemical reaction or crosslinking (other than simple H-bonding) between the different polymers in the polymer matrix." (See, page 6, lines 18-21 of the instant specification). The two or more polymers in the claimed composition include a first acrylic-based polymer having a first functionality and solubility parameter, and a second acrylic-based polymer having a second functionality and solubility parameter. The first and second functionalities differ in the amount and type of functional groups to provide an acrylic-based polymer combination having a net functionality proportional to the ratio of the first and second acrylic-based polymers.

The present invention further relates to a method of producing a dermal composition which includes producing a blend of a polymer composition of two or more polymers and a therapeutically effective amount of one or more drugs incorporated into the polymer composition; forming the blend into a polymer matrix; and drying the polymer matrix to remove the solvent system to form the dermal composition. The method sets forth that the polymer composition includes a first acrylic-based polymer having a first functionality and solubility parameter; and a second acrylic-based polymer having a second functionality and solubility parameter, wherein the first and second functionalities differ in the amount and type of functional groups to provide an acrylic-based polymer combination having a net functionality proportional to the ratio of the first and second acrylic-based polymers used, and wherein the first and second acrylic-based polymers are blended in proportions to provide a net solubility parameter.

Finally, the present invention relates to a method of controlling the flux of a drug from a dermal drug delivery composition which comprises selecting at least two acrylic-based polymers; combining the at least two acrylic-based polymers with a therapeutically effective amount of one or more drugs to form the dermal drug delivery composition, wherein the one or more drugs have a flux which is determined by the net solubility in the composition and is different than the flux of a composition produced solely from said first or second acrylic-based polymers alone. According to this method, a first acrylic-based polymer has a first functionality and solubility parameter; and a second acrylic-based polymer has a second functionality and solubility parameter, wherein said first and second functionalities differ in the amount and type of functional groups to provide a polymer combination having a net solubility of one or more drugs within the composition proportional to the ratio of the first and second acrylic-based polymers used.

III. Claims 1-12, 19-20 and 26-30 Are Not Anticipated by the Prior Art of Record

Claims 1-12, 19 and 20 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Nagai whereas claims 1-4, 6-8, 11, 12, 19, 20 and 26-30 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Xia. Applicants respectfully request reconsideration.

Nagai relates to an analgesic adhesive which comprises a mixture of (a) indomethacin, (b) a ***copolymer*** of (i) an alkyl acrylate and (ii) a functional monomer having a functional group in the molecule thereof; and (c) an absorption accelerating assistant. (See, Nagai, Col. 2, lines 21-27). Xia relates to a skin permeation enhancer for use with sex steroids which includes a pressure sensitive adhesive. Xia discloses that the pressure sensitive adhesive can include solution polyacrylate adhesives which are made by ***copolymerizing*** one or more acrylate monomers, one or more modifying monomers, and one or more functional group-containing monomers in an organic solvent. (See, *e.g.*, Xia, Col. 2, lines 28-39).

As set forth in the specification, the present invention recites a "blend" (*i.e.*, a physical combination of polymers where there is no, or substantially no, chemical reaction or crosslinking between the different polymers in the polymer matrix) of two or more acrylic-based polymers. Both Nagai and Xia disclose the use of a single poylmer. Neither Nagai nor Xia disclose a blend of two or more polymers where the polymer composition includes a first acrylic-based polymer having a first functionality and solubility parameter; and a second acrylic-based polymer having a second functionality and solubility parameter, wherein the first and second acrylic-based polymers are blended in proportions to provide a net solubility parameter, as set forth in the instant claims.

It is well settled that an invention lacks novelty under 35 U.S.C. § 102 ***only*** if each and every element of the claim is described or disclosed, either explicitly or inherently, in a single prior art reference. *Finnigan Corp. v. International Trade Com'n*, 180 F.3d 1354, 1365 (Fed. Cir. 1999). In fact, the identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989). Here, neither Nagai nor Xia disclose or suggest the instantly claimed invention. For at least these reasons, claims 1, 26 and 30 are patentable over Nagai and Xia. Since claims 2-25, and 27-29 depend from claims 1 and 26, respectively, for at least this reason, these claims are also patentable over Nagai and Xia.

III. Claims 1-30 Would Not Have Been Obvious Over Miranda

Claims 1-30 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Nagai, Xia or Miranda et al. (Miranda). Applicants respectfully request reconsideration.

As set forth above, Nagai and Xia relate to the use of a single acrylic acid polymer. Miranda discloses a blend of acrylic-based adhesives and polysiloxanes. None of the references, alone or in combination, disclose or suggest the instantly claimed invention which includes forming a dermal composition by blending a polymer composition of two or more acrylic-acid based polymers and a therapeutically effective amount of one or more drugs.

In rejecting claims under 35 U.S.C. §103, it is incumbent upon the PTO to establish a factual basis to support the legal conclusion of obviousness. See *In re Fine*, 837 F.2d 1071, 1073, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). In so doing, the PTO is expected to make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art reference to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051, 5 U.S.P.Q.2d 1434, 1438 (Fed. Cir. 1988), cert. denied, 488 U.S. 825 (1988). The PTO has failed to meet their burden of presenting a *prima facie* case of obviousness.

Nagai and Xia teach use of a single polymer, specifically an acrylate copolymer, while the instant claims are directed to a blend or physical mixture of two different polymers, namely a physical mixture of two acrylate polymers. There is nothing in either Nagai or Xia that discloses or suggests blending, *i.e.*, physically combining, two or more different polymers where there is no, or substantially no, chemical reaction or crosslinking between the different polymers in the polymer matrix. Nagai and Xia, if

anything, suggest modifying the amounts and types of monomers units in the single polymer.

Furthermore, nothing in Nagai and/or Xia suggests that a mixture of two different acrylate polymers was comprehended, nor does the cited art further suggest that a mixture of two different polymers would affect the delivery profile of the drug. A single acrylate polymer, be it a homopolymer, a copolymer, a terpolymer, etc., will have fixed properties and a fixed delivery profile for any given system. In contradistinction, all the claims of the instant application refer to mixing of two different acrylate polymers having two different functionality and solubility parameters. The effect of the mixing is to affect and control the delivery profile for the drug. Neither Nagai nor Xai, either alone or in combination, disclose or suggest the presently claimed invention.

Miranda does not cure the deficiencies of Nagai and/or Xai. Applicants appreciate that Miranda teaches a blend of a polysiloxane polymer and a polyacrylate polymer. However, Miranda does not disclose or suggest blending two different polyacrylate polymers based on their functionality (i.e., two different polymers from the same class of polymers), nor does Miranda disclose or suggest the effect on drug solubility and drug delivery by blending different acrylate polymers based on their functionality. The person having ordinary skill in the art would not have been motivated to blend two different acrylate polymers in light of the references. First, there would have been no motivation to use two different acrylate polymers to achieve what the art suggests might be done by modifying the monomer makeup of a single acrylate polymer. Second, the art teaches away from using more of the same type of polymer to achieve an improved and controlled delivery. Acrylate polymers are known to be good drug solubilizers, especially for hydrophobic drugs. Once a drug is solubilized, the drug needs to be delivered out of the patch and into the skin of the user. The cited references do not disclose or even remotely suggest that the same component that solubilizes drug would be a reasonable choice to also deliver it out of the patch. However, applicants found that by blending two such polymers with differing functionalities, the net effect is one that achieves both purposes substantially without the need for additional components such as drug enhancers, to affect and control the

delivery profile for the drug. This was not disclosed or suggested by the cited references, either alone or in combination.

The person having ordinary skill in the art would not have expected, from the teachings of the references, that by physically combining two or more acrylic-based polymers having different functionalities and different solubility parameters with a therapeutically effective amount of one or more drugs the resultant polymer composition would have a desirable net solubility parameter which could be useful as a dermal composition, as claimed. In contrast, the person having ordinary skill in the art would have expected that large amounts of drug would have to be incorporated into the dermal drug delivery composition to saturate it.

One way of overcoming the problems of high drug loading and degradation is to physically blend the acrylic-based polymer with another polymer, such as a polysiloxane as taught by Miranda. However, Miranda does not disclose or suggest blending two different polyacrylate polymers based on their functionality, nor does Miranda disclose or suggest the effect on drug solubility and drug delivery by blending different acrylate polymers based on their functionality. At best, Miranda in combination with Nagai and/or Xai would have taught the person having ordinary skill in the art to combine a polysiloxane with the particular acrylic copolymers of Nagai and/or Xai. In any event, the person having ordinary skill in this art would not have arrived at the claimed invention.

Until the present invention, it was not appreciated by the person having ordinary skill in the art that by selecting and combining two or more different acrylic-based polymers having different functionalities and different solubility parameters, that the solubility of a drug in a transdermal composition and hence its rate of delivery from the composition could be controlled. Neither Nagai, Xai, nor Miranda, either alone or in combination, disclose or suggest the subject matter of claims 1, 26 and 30. Since claims 2-25 and 27-29 depend from these claims, for at least this reason these claims are also patentable over Nagai, Xai, and Miranda.

IV. Conclusion

For at least these reasons, it is submitted that none of the references relied upon by the Examiner disclose or suggest the presently claimed invention. In view of the foregoing, it is respectfully urged that claims 1-30 are in condition for allowance. An early notice to this effect is earnestly solicited. Should there be any questions, Examiner Ghali is courteously invited to contact the undersigned at the telephone number shown below.

Respectfully submitted,

Date September 23, 2002

By _____

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Marked up rewritten claim:

11. (Amended) A dermal composition as claimed in claim 1, wherein the at least two **[polymer]** polymers contain substantially only the first and second acrylic-based polymers.

17. (Amended) A dermal **[system]** composition as claimed in claim 16, wherein the carboxyl functional acrylic-based polymer includes 0.1 to 12% by weight of carboxyl functional monomer units.

18. (Amended) A dermal **[system]** composition as claimed in claim 16, wherein the carboxyl functional monomer units are acrylic acid.

22. (Amended) A dermal **[system]** composition as claimed in claim 21, wherein the carboxyl functional acrylic-based polymer includes 0.1 to 12% by weight of carboxyl containing monomer units and the hydroxy functional acrylic-based polymer includes 0.1 to 10% by weight of hydroxy containing monomer units.

23. (Amended) A dermal **[system]** composition as claimed in claim 21, wherein the carboxyl containing functional monomer units are acrylic acid, and the hydroxy containing monomer units are 2-hydroxy ethyl acrylate.

24. (Amended) A dermal **[system]** composition as claimed in claim 6, wherein the drug includes scopolamine.

30. (Amended) A method of controlling the flux of a drug from a dermal drug delivery composition, comprising the steps of:

(a) selecting at least two **[polymer]** polymers which includes:

(i) a first acrylic-based polymer having a first functionality and solubility parameter; and

(ii) a second acrylic-based polymer having a second functionality and solubility parameter, wherein said first and second functionalities differ in the amount and type of functional groups to provide a polymer combination having a net solubility of one or more drugs within the composition proportional to the ratio of the first and second acrylic-based polymers used;

(b) combining the at least two acrylic-based polymers with a therapeutically effective amount of one or more drugs to form the dermal drug delivery composition,

wherein the one or more drugs have a flux which is determined by the net solubility in the composition and is different than the flux of a composition produced solely from said first or second acrylic-based polymers alone.